

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: SOON HO AHN, et al.)
Serial No.: 10/588,481) Group Art Unit 1795
Filed: August 1, 2006)
For: NON-AQUEOUS ELECTROLYTE)
AND LITHIUM SECONDARY) Examiner: WEINER, Laura S.
BATTERY USING THE SAME) Confirmation No. 8797
)

**REPLY TO FINAL OFFICE ACTION
UNDER 37 C.F.R. § 1.116, WITH AMENDMENT**

Via EFS
Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DO NOT ENTER: /LW/
/LW/ 10/08/2010

Dear Sir:

Applicants respectfully request entry of the following amendment and remarks in response to the Final Office Action dated July 6, 2010.

Amendments to the Claims are reflected in the listing of claims that begin on page 2 of this paper; and

Remarks/Arguments beginning on page 8 of this paper.

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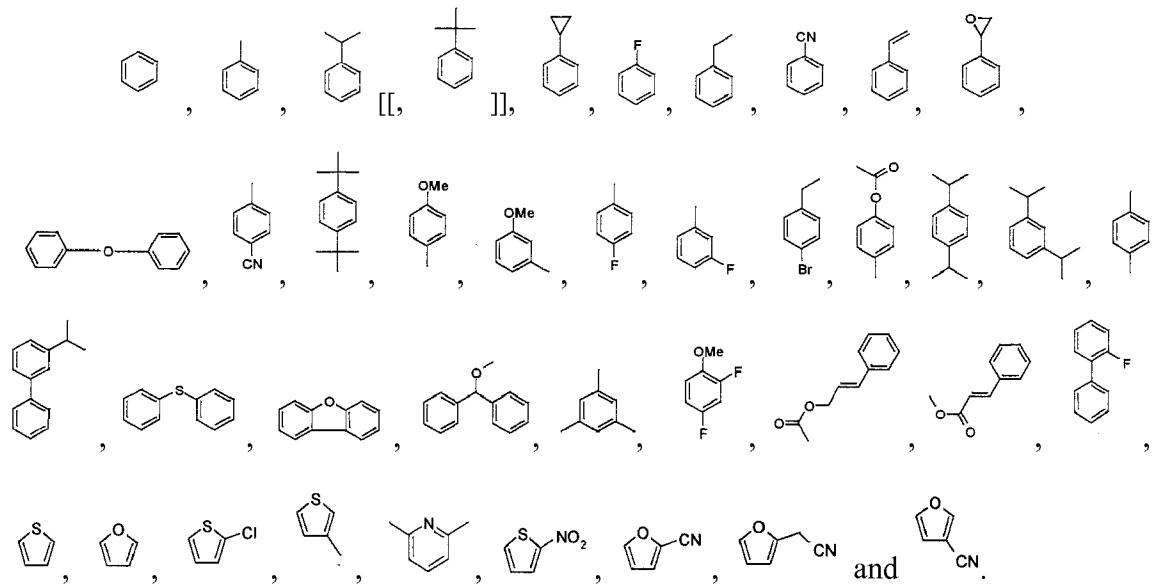
IN THE CLAIMS:

1 – 9. (Cancelled)

10. (Currently Amended) A nonaqueous electrolyte solution comprising the following components:

- i) a lithium salt;
- ii) an electrolyte solvent;
- iii) a first additive compound with an oxidation initiation potential of more than 4.2 V; and
- iv) a second additive compound with an oxidation initiation voltage of more than 4.2 V, which is higher in oxidation initiation potential than the first additive, and which deposits oxidative products or forms a polymer film, in oxidation,

wherein the first additive is selected from the group consisting of



11. (Previously Presented) The nonaqueous electrolyte of Claim 10, wherein the content of the first additive is 0.1-2% by weight, and the content of the second additive is 0.5-5% by weight.

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12. (Previously Presented) The nonaqueous electrolyte solution of Claim 10, wherein the oxidation initiation potential of the additives iii) and iv) is 4.2-5.3V.

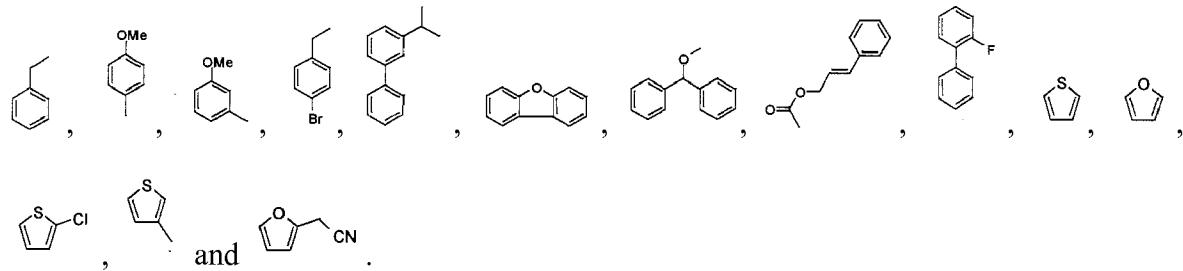
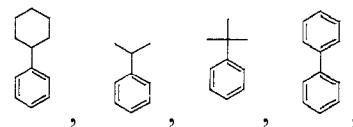
13. (Previously Presented) The nonaqueous electrolyte solution of Claim 12, wherein the oxidation initiation potential of the additives iii) and iv) is 4.5-4.9V.

14. (Previously Presented) The nonaqueous electrolyte solution of Claim 10, wherein the compounds of the additives iii) and iv) with an oxidation initiation potential of more than 4.2V are aromatic compounds with an oxidation initiation potential of more than 4.2 V.

15. (Cancelled)

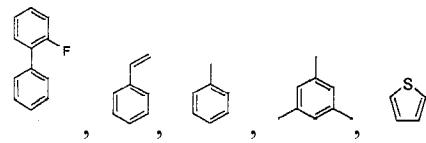
16. (Previously Presented) The nonaqueous electrolyte solution of Claim 10, wherein

the second additive is selected from the group consisting of



17. (Previously Presented) The nonaqueous electrolyte solution of Claim 10, wherein

the first additive is selected from the group consisting of

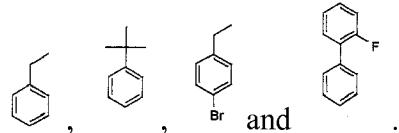
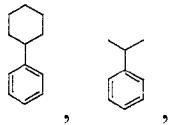


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and  , and the second additive is selected from the group consisting of



18. (Previously Presented) A lithium secondary battery comprising the following components:

- a) a cathode capable of absorbing and releasing lithium ions;
- b) an anode capable of absorbing and releasing lithium ions;
- c) a porous separator; and
- d) the nonaqueous electrolyte solution according to Claim 10.

19. (Previously Presented) The lithium secondary battery of Claim 18, wherein the content of the first additive compound is 0.1-2% by weight, and the content of the second additive compound is 0.5-5% by weight.

20. (Previously Presented) The lithium secondary battery of Claim 18, wherein the oxidation initiation potential of the additives iii) and iv) is 4.2-5.3V.

21. (Previously Presented) The lithium secondary battery of Claim 20, wherein the oxidation initiation potential of the additives iii) and iv) is 4.5-4.9V.

22. (Previously Presented) The lithium secondary battery of Claim 18, wherein the compounds of the additives iii) and iv) with an oxidation initiation potential of more than 4.2V are aromatic compounds with an oxidation initiation potential of more than 4.2 V.

23. (Cancelled)

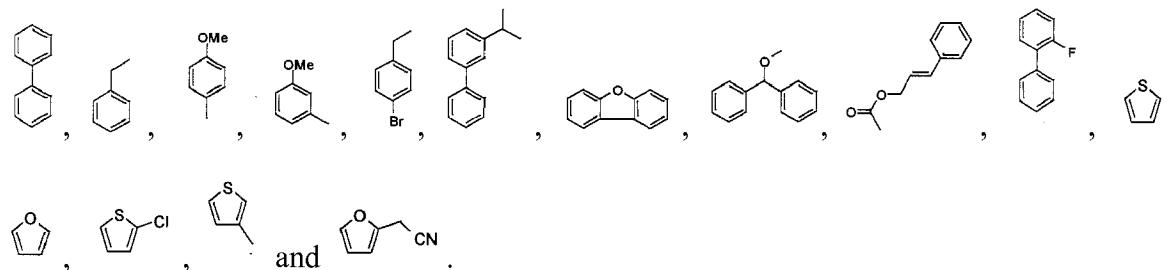
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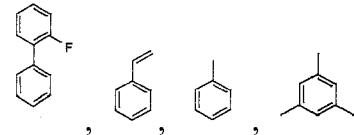
24. (Previously Presented) The lithium secondary battery of Claim 18, wherein the

second additive compound is selected from the group consisting of

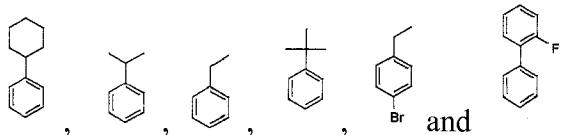


25. (Previously Presented) The lithium secondary battery of Claim 18, wherein the

first additive compound is selected from the group consisting of



and the second additive compound is selected from the group consisting of



26. (Withdrawn) A nonaqueous electrolyte solution comprising:

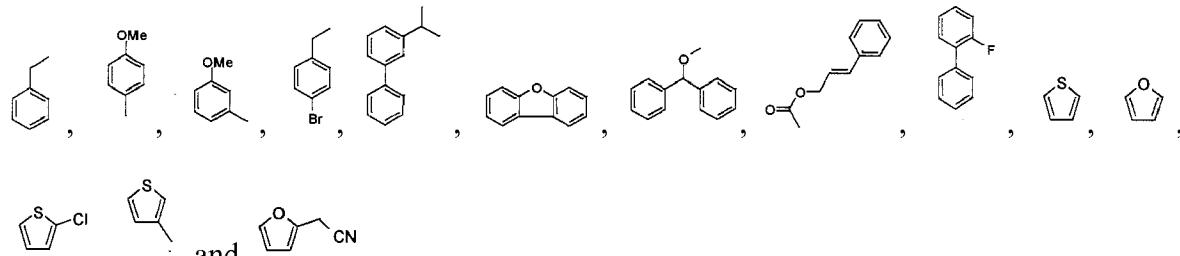
- i) a lithium salt;
- ii) an electrolyte solvent;
- iii) a first additive compound with an oxidation initiation potential of more than 4.2 V; and
- iv) a second additive compound with an oxidation initiation voltage of more than 4.2 V, and which is higher in oxidation initiation potential than the first additive, and which deposits oxidative products or forms a polymer film, in oxidation,

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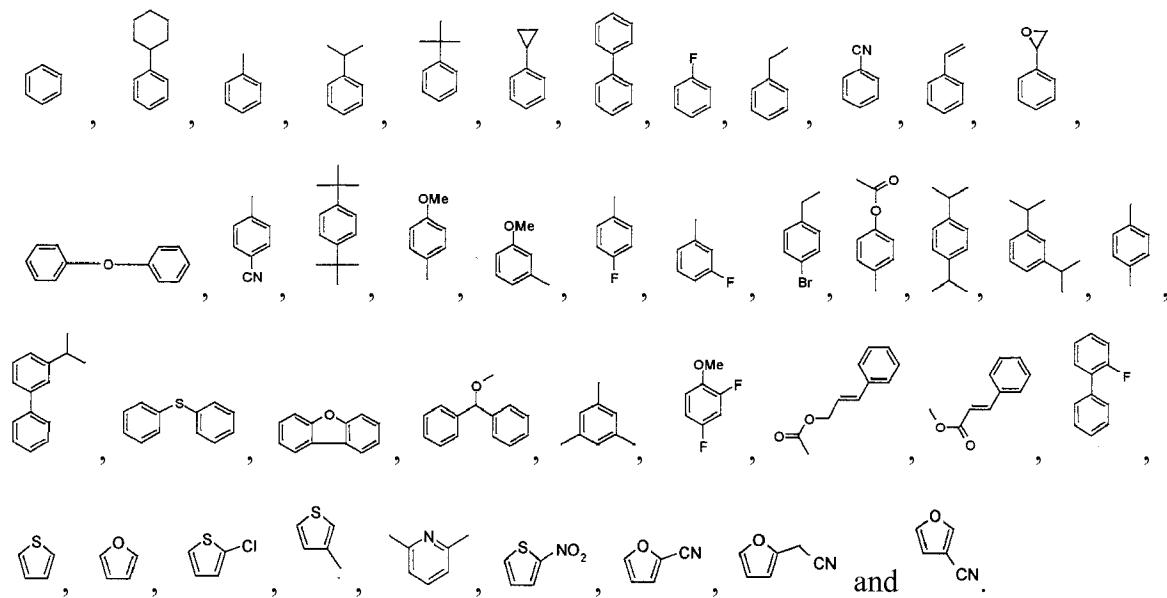
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wherein the second additive is selected from the group consisting of



27. (Withdrawn) The nonaqueous electrolyte solution of claim 26, wherein the first additive is selected from the group consisting of



28. (Withdrawn) A lithium secondary battery comprising:

- a) a cathode capable of absorbing and releasing lithium ions;
- b) an anode capable of absorbing and releasing lithium ions;
- c) a porous separator; and
- d) the nonaqueous electrolyte solution according to claim 26.

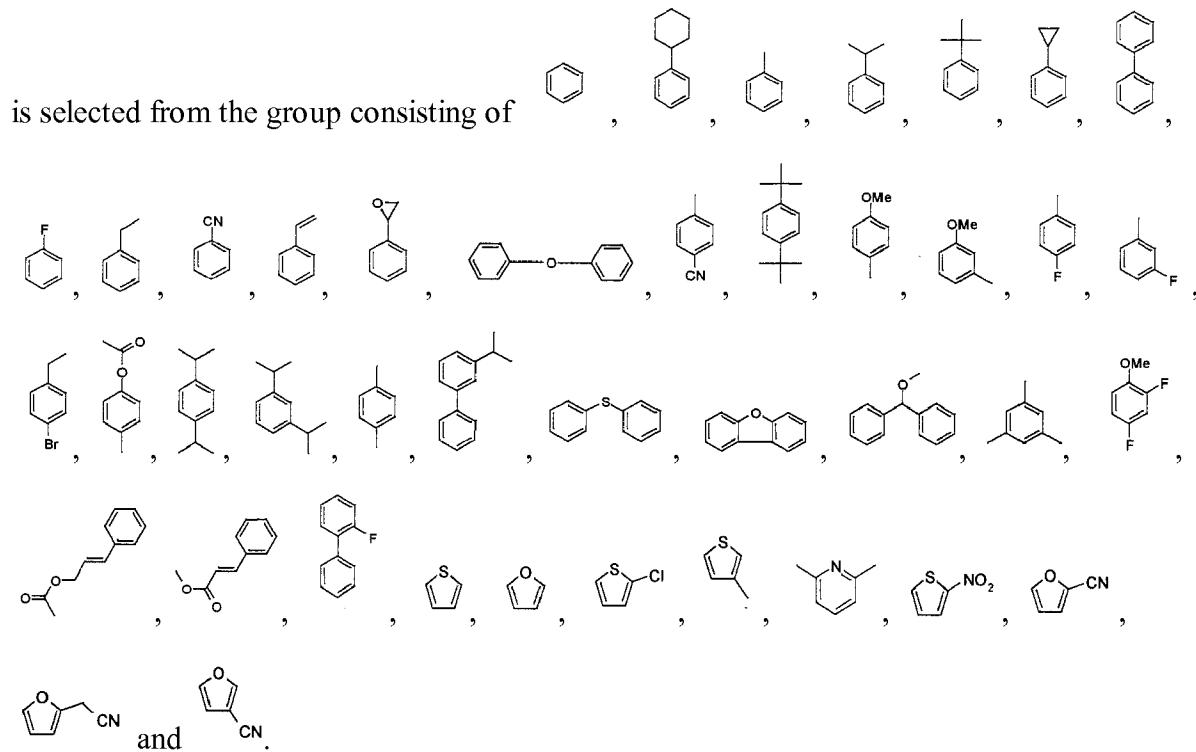
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29. (Withdrawn) The lithium secondary battery of claim 28, wherein the first additive

is selected from the group consisting of



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REMARKS

Claims 10-25 are pending in the present Application. Claim 10 has been amended, claims 1-9, 15, and 23 have been previously cancelled, and claims 26-29 have been withdrawn, leaving claims 10-14, 16-22, and 24-25 for consideration upon entry of the present Amendment.

Support for the amendment to claim 10 can be found at least in claim 6 as originally filed.

Reconsideration and allowance of the claims are respectfully requested in view of the above amendments and the following remarks.

Claim Rejections Under 35 U.S.C. § 102(b)/(e)/§ 103(a)

Claims 10-14, 16-22, and 24-25 stand rejected under 35 U.S.C. § 102(b)/(e) as being allegedly anticipated by Abe et al. (WO 02/059999/US 7,294,436, hereinafter “Abe”) as stated on pages 3-4 of the Office Action dated July 6, 2010. Citations to Abe herein are to the U.S. Patent, U.S. 7,294,436. The Examiner states that Abe teaches all of the elements of claims 10-14, 16-22, and 24-25, including a battery comprising an electrolyte comprising 0.01-10 wt% tert-alkylbenzene and 0.1-1.5 wt% of a biphenyl compound. (Office action dated July 6, 2010, p. 3)

Also, claims 10-14, 16-22, and 24-25 stand rejected under 35 U.S.C. § 102(b)/(e) as anticipated by or, in the alternative, 35 U.S.C. § 103(a) as being allegedly obvious over Abe et al. (WO 02/059999/US 7,294,436, hereinafter “Abe”) as stated on pages 4-5 of the Office Action dated July 6, 2010. The Examiner states that Abe teaches all of the elements of claims 10-14, 16-22, and 24-25, including a battery comprising an electrolyte comprising 0.01-10 wt% tert-alkylbenzene and 0.1-1.5 wt% of a biphenyl compound. (Office action dated July 6, 2010, p. 4)

The Applicants respectfully traverse these rejections for at least the following reasons and address them together.

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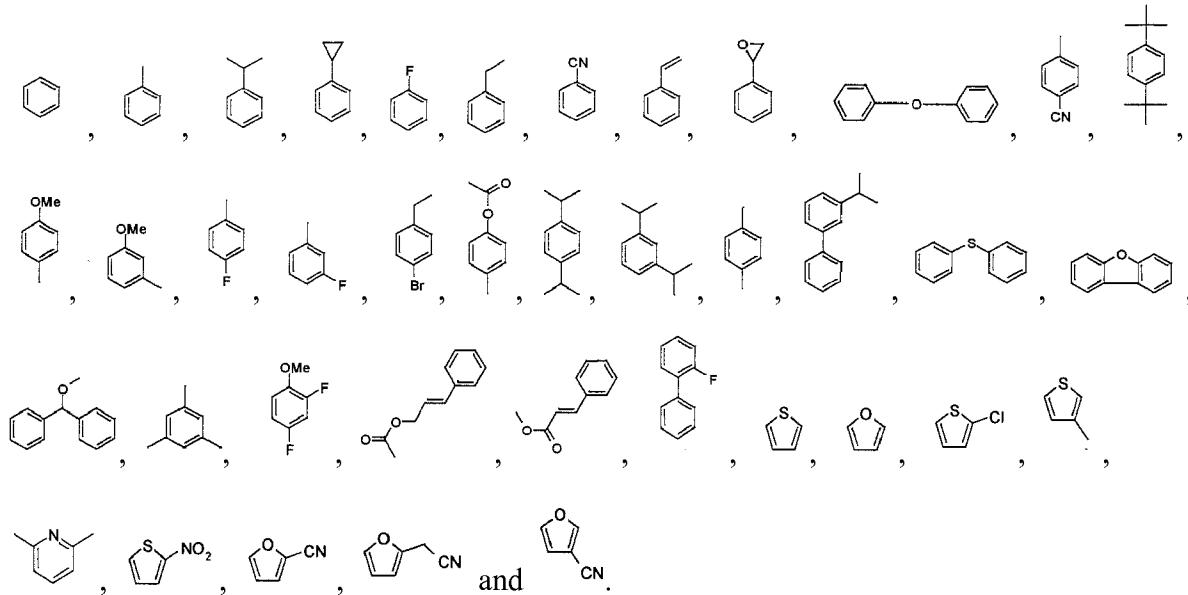
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To anticipate a claim, a reference must disclose each and every limitation of the claim.

Lewmar Marine v. Varient Inc., 3 U.S.P.Q.2d 1766 (Fed. Cir. 1987). Moreover, the single source must disclose all of the claimed elements “arranged as in the claim.” *Structural Rubber Prods. Co. v. Park Rubber Co.*, 749 F.2d 707, 716, 223 U.S.P.Q. 1264, 1274 (Fed. Cir. 1984). Missing elements may not be supplied by the knowledge of one skilled in the art or the disclosure of another reference. *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 780, 227 U.S.P.Q. 773, 777 (Fed. Cir. 1985).

For an obviousness rejection to be proper, the Examiner is expected to meet the burden of establishing why the differences between the prior art and that claimed would have been obvious. (MPEP 2141(III)) “A patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.” *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1741 (2007). To find obviousness, the Examiner must “identify a reason that would have prompted a person of ordinary skill in the art in the relevant field to combine the elements in the way the claimed new invention does.” *Id.*

Amended claim 10 recites a nonaqueous electrolyte comprising a first additive and a second additive, wherein the first additive is selected from the group consisting of



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Abe discloses an electrolyte comprising a tert-alkylbenzene compound and biphenyl. (Abe, col. 3, lines 38-39) Abe states that the tert-alkylbenzene compound preferably has the formula $(R^1)(R^2)(R^3)C-\phi^1$ in which each of R^1 , R^2 , R^3 independently is an alkyl group of 1 to 4 carbon atoms. (Abe, col. 3, line 43)

Abe does not disclose, teach, or suggest a nonaqueous electrolyte wherein the first additive is selected from the claimed group, which does not contain a tert-alkylbenzene. Abe teaches an electrolyte including a tert-alkylbenzene and biphenyl.

Furthermore, the Applicants respectfully assert that the synergistic results disclosed by the Applicants further support the patentability of the instant claims. For example, the Applicants disclose in Examples 6 to 11 the results using the additives isopropylbenzene, vinylbenzene, toluene, mesitylene, thiophene, and furan with biphenyl, ethylbenzene, t-butylbenzene, bromoethylbenzene, cyclohexylbenzene, and fluorobiphenyl, respectively. (Specification, p. 22, Table 4) For at least the reason that Abe does not teach or suggest the first additives isopropylbenzene, vinylbenzene, toluene, mesitylene, thiophene, or furan, one of ordinary skill in the art would not have been prompted to consider adding such compounds to a nonaqueous electrolyte, let alone expect the unexpected and synergistic improvement in overcharge performance disclosed by the Applicants.

Accordingly, for at least these reasons, Abe does not anticipate or render obvious the subject matter of independent claim 10. Claims 11-14, 16-22, and 24-25 depend from claim 10, and thus include the allowable elements of claim 10. Thus the dependent claims are patentable over the cited references for at least the reasons given above for independent claim 10.

Accordingly, reconsideration, withdrawal of the rejection of claims 10-14, 16-22, and 24-25 under 35 U.S.C. § 102(b)/(e), or in the alternative under 35 U.S.C. § 103(a), and allowance of the instant claims are respectfully requested.

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Conclusion

It is believed that the foregoing amendments and remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and withdrawal of the objection(s) and rejection(s) and allowance of the case are respectfully requested.

Applicants hereby petition for any necessary extension of time required under 37 C.F.R. 1.136(a) or 1.136(b) or any other necessary fees(s), which may be required for entry and consideration of the present Reply.

If there are any additional charges due with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130 maintained by Applicants' Attorneys.

Respectfully submitted,

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Applicants' Attorneys

Date: October 6, 2010

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